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SCIENCE

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FRIDAY, JULY 7, 1899.

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KNOWLEDGE AND PRACTICE.*

THE honor of delivering the address upon this occasion is great; the responsibility of appearing as the successor of the distinguished men who have addressed you in

* Yale University Medical Commencement Address, June 29, 1899.

previous years is also great, yet, as I thank you for your generous welcome, I feel, most of all, the pleasure of being the guest of Yale. To a Harvard man an honor bestowed by Yale has a special and very pleasant value.

Yale and Harvard have been working together for two centuries; their aims have always been similar; their developments have been parallel, and they have long sought one another for those friendly contests, intellectual and athletic, which yearly renew the close bonds between the two universities. I hope that their experience has been mutually helpful, for I am sure at least that Harvard has often learned from Yale, and they both have the same problems to solve if necessary.

Just at present there is a whole series of urgent problems in medical education before both institutions, and I shall, with your permission, try now to contribute to the discussion of some of those problems. You, who are upon the eve of graduation, know that you have received a far better preparation for the practice of medicine than was possible for any one to obtain a generation ago. You owe this advantage to the constant recognition of the possibility of improvement in medical education, and you should carry forth the feeling that it is now your duty to promote further progress in the organization and methods of medical schools. It is, therefore, eminently fitting

the results of experiments in agriculture, horticulture and arboriculture, the outcome of practical work in the fields, barns, dairy and poultry buildings, orchards and plantations, as well as scientific investigations in the chemical laboratory and the results of studies of the life history of injurious insects and noxious weeds. Variety tests have occupied much of the attention of the agriculturist and horticulturist, the evident desire being to secure the best varieties for the different regions. In this way experiments in the adaptation of certain crops and varieties are conducted upon a scale impossible to the individual, and not a few valuable crops have been secured by this means. Methods of culture and the proper use of fertilizers have been quite thoroughly investigated, to the advantage of the several constituencies. In the treeless regions of Manitoba and Northwest Territories tree-planting experiments have been conducted since the establishment of the branch farms in these Provinces, and, as a result, it is now possible to suggest lists of trees and shrubs adapted for hedge, shelter and timber growth in those regions.

Among results of particular interest and of far-reaching importance noted in the last report is the account of experiments on the effect the plowing under of clovers has on subsequent crops. These experiments have been continued for four years and the beneficial effect of such procedure is plainly shown.

In connection with the variety tests of the agriculturist, attention should be called to the very excellent work done in cross-breeding of cereals. At least two score cross-bred varieties of wheat, and quite a number of varieties of oats, barley and peas have had their origin on the Experimental Farms and some of them seem to be peculiarly adapted to the region, being of more than average productivity and quite resistant to fungus attacks.

The dairy investigations and the experiments in feeding farm animals, especially steers and pigs, have been noteworthy and have led to some very practical results. In nearly every case the feeding experiments were repeated year after year and the conclusions verified.

Among the investigations made by the chemist, the comprehensive survey made of the typical soils of the different Provinces in which

their physical characteristics and chemical constituents were determined stands out prominently.

The study of the life history of injurious insects and the investigation of means for combating their attacks have occupied much of the time of the entomologist and botanist. In addition, the subject of noxious weeds, their dissemination and eradication has been investigated. With such subjects as these the efficiency of any method for the destruction of these pests depends largely upon timely warnings which have been given as the emergency arose. Spraying for the prevention of plant diseases has come in for attention and the suggestions given are timely and practical.

The poultry manager has been concerned principally with studying the relative values of different breeds of fowls and their feeding and management.

Throughout all the reports the intensely practical nature of the work is everywhere manifest, the desire apparently being to give results of investigations that may be of immediate use to the farmers and others of the Dominion.

WALTER H. EVANS.

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WASHINGTON, D. C.

BOOKS RECEIVED.

Naturalism and Agnosticism. JAMES WARD. New York and London, The Macmillan Company. 1899. Vol. I., pp. xviii+302; Vol. II., pp. xiii+294. \$4.00.

La géologie expérimentale. STANISLAS MEUNIER. Paris, Alcan. 1899. Pp. viii+306 and 56 figures. 6 fr.

Manual of Bacteriology. ROBERT MUIR and JAMES RITCHIE. Edinburgh and London, Young J. Pentland; New York, The Macmillan Company. 1899. Pp. xviii+564.

SCIENTIFIC JOURNALS AND ARTICLES.

THE leading article, in every sense, of the *American Naturalist* for June is that of Sylvester D. Judd on 'The Efficiency of Some Protective Adaptations in securing Insects from Birds.' The author's conclusions, based upon four years' study of the food habits of birds, are that the alleged protective coloration is not the all-important factor in securing an insect from ex-